

# Capital University of Economics and Business

## Overseas Chinese College

### Course Syllabus

<b><u>Year and Semester</u></b>	2022 Spring (Feb, 28, 2022 – June, 17, 2022)
<b><u>Course Name</u></b>	Computer Networking
<b><u>Course Code</u></b>	MIS225
<b><u>Course Type</u></b>	<input type="checkbox"/> General Education (Required) <input type="checkbox"/> General Education (Elective) <input checked="" type="checkbox"/> Professional Course (Required) <input type="checkbox"/> Professional Course (Elective) <input type="checkbox"/> Basic Disciplinary Course
<b><u>Course Credits</u></b>	3
<b><u>Course Hours</u></b>	48
<b><u>Prerequisites</u></b>	Fundamental of Computer Science
<b><u>Instructor</u></b>	Prof. Amy Ru
<b><u>Contact Information</u></b>	Office: C217 Tele: (010)83951082 Email: ruchangjun@cueb.edu.cn
<b><u>Office Hour</u></b>	Tue.: 13:30-17:00, Wed. & Fri.: 9:00-10:00
<b><u>Learning Centre</u></b>	Mon.: 10:00-12:00, 18:00-20:00
<b><u>Grade/Section</u></b>	2019 ACCA1&2
<b><u>Course Time/Place</u></b>	Mon. 13:30-16:10/5#204
<b><u>Textbook</u></b>	Kurose & Ross, <i>Computer Networking A top-down approach</i> , 7 <sup>th</sup> edition; ISBN: 9780134312804

#### **Reference Book**

Computer Networks, fifth Edition by Andrew S. Tanenbaum and David J. F. Wetherall  
The textbook and reference book mainly cover the knowledge that instructor introduced in the class, but not limited to these books, students should have the ability to search and expose to the resources to support study.

#### **Course Description**

The purpose is a further study the network part of introduction to computer technology and providing a meaningful foundation for Web Design and Programming. The main content includes networking architecture and working principle of TCP/IP protocol stack. Students will be capable of systematically analyze reliable data transfer in networking. Students develop their lifelong skills and values via application of networking knowledge and capability. Students will extend daily internet applications including website/e-mail/video to specific protocols. Students develop their operation ability in capturing packets. Students strengthen their planning ability via designing and allocating IP addresses for subnets and hosts in enterprise.

#### **Student Learning Objectives**

After learning this course, students will be able to:

##### **Knowledge:**

- ◆ Explain the network terminology (protocol stack, host, delay, packet, route, DNS, ISP, Dos)
- ◆ Identify five layers in internet protocol stack;
- ◆ Summarize the popular protocols in application layers;
- ◆ Understand working principles behind transport layer services (multiplexing, reliable data transfer)
- ◆ Describe working principles behind network layer services (forwarding versus routing)

##### **Capability:**

- ◆ Contrast the two mode of application structure: client/server models VS peer to peer models;
- ◆ Compare the packet switching with packet switching (effectiveness, way of using resource);
- ◆ Choose proper transport protocols for different applications such as website, e-mail, video conferencing;

- ◆ Analyze TCP Congestion Control (slow start, congestion avoidance, fast recovery);
- ◆ Recommend a security plan to protect computer networking from attacking;
- ◆ Develop an allocation plan according enterprise's requirements (number of departments, number of employees in each department, subnets, hosts);
- ◆ Conduct effective professional communication skills in computer networking area

#### **Mindset:**

- ◆ Establish the objectivity in computer networking workplace
- ◆ Develop systematical and logical mind through learning protocol stack
- ◆ Apply critical thinking in the process of capturing and analyzing packets

#### **Website Source**

[https://wps.pearsoned.com/ecs\\_kurose\\_compnetw\\_6/216/55463/14198700.cw/index.html](https://wps.pearsoned.com/ecs_kurose_compnetw_6/216/55463/14198700.cw/index.html)

#### **Teaching Methods**

This course contains lectures, poster (internet applications), group discussions (5 layers), brainstorming(protocol), group work (Wireshark Labs: HTTP, TCP), Role Play (multiplexing), class debate (circuit VS packet switching), homework, quizzes, presentation and exams. Textbook content will be introduced first. Then real case and practice questions will be delivered to students as a way to test their understanding of the knowledge. This will require individual or group assignment in class.

#### **Grade Criterion**

Component	Weight	Description
Final Exam	20%	A cumulative final examination will be given based on all of the contents of the class. The exam paper may be composed of multiple-choice questions, short answer questions, essay questions and practice problems. Students should rely primarily on homework assignments to give them a sense of what they may see for material on exams.
Mid-Term Test	20%	A cumulative midterm test will be given based on all of the contents that have been taught in class. The test paper may be mainly composed of multiple-choice questions and it should be completed within 60 minutes in class.
Homework	10%	Most of the assigned homework is taken from the Exercises in the textbook. Assignments will be collected at the clearly stated date. Late assignments will not be accepted. The graded assignments will be kept by the tutor for reference and won't be returned to students.
Quizzes	10%	There will be at least 2 quizzes during the semester. Quizzes may or may not be announced in advance. It may also be used as a way to check the attendance. Quizzes will test your knowledge of both concepts and the application of those concepts.
Presentation	20%	1. 25%: Contents (relevance, depth, quality, ideological and political element, practical business value) 2. 25%: Presentation Skill (logical, expressive, appealing, degree of reading from manuscripts or slides, preparation and attitude) 3. 10%: Time management and Teamwork 4. 10%: participation (make notes & comments for all groups) 5. 10%: PPT making skill (Visually helpful) 6. 10%: English fluency
Participation	10%	Individuals will be asked to participate individually in a question and answer at least 5 times during the semester. The performances should be counted in their participation.
Attendance	10%	Refer to attendance policy listed below
<b>Total</b>	<b>100%</b>	

#### **Detailed Grade Computation**

	Before Midterm	After Midterm
Attendance	5%	5%
Participation	5%	5%
Homework	5%	5%
Quizzes	5%	5%
Presentation		20%

Midterm test	20% (5% of critical thinking)	
Final exam		20% (5% of critical thinking)
Total	40%	60%

### Grading Policy

A+ 97-100	A 93-96	A- 90-92	B+ 87-89	B 83-86	B- 80-82
C+ 75-79	C 70-74	C- 67-69	D+ 63-66	D 62-60	F 0- 59

### Exam Schedule

Midterm Test: 25<sup>th</sup> – 29<sup>th</sup> April

Final Exam: 20<sup>th</sup> – 24<sup>th</sup> June

### Assessment of Student Performance

#### *☞ Self-Study and Reading ability Practice*

Instructor will give out the chapters or the reference books to read and use class hours to have discussion; students should be able to show a proactive attitude and ability for self-study and reading. Knowledge and oral English will be elements of homework or presentation score.

#### *☞ Homework*

Students should finish their homework by themselves. Copying from others will be treated as cheating and the homework scores will be lowered. Students should hand in all assignments on time. Late assignments will be accepted at the discretion of the instructor (i.e., when the student was ill or had an excused absence). Late assignments without reasonable proof will be reduced in score by 50%.

#### *☞ Attendance*

Because the course covers a great deal of material, attending every class session is very important for performing well.

- ◆ Being late for 15 minutes or more is considered an absence.
- ◆ Five hours or above of unexcused absences will result in the lower level of the final grade by one grade band (e.g. from C – to D +). Any excused absence must be discussed directly with the teacher.
- ◆ Absence which is more than 1/3 of the total teaching hours will cause an F (a failing grade) directly, but students are welcome to continue attending classes.
- ◆ An incomplete grade (I) will be considered in case of medical or family emergencies.

#### *☞ Participation*

- ◆ Students should participate in classes actively. Half of participation grade is determined by their presentation in class. They are encouraged to ask questions relevant to the subject and express their own opinions. Every student should respect the ideas, opinions, and questions of their classmates.
- ◆ Students should also use office hours to ask questions or talk with the instructor for good communication and effective learning.
- ◆ Frequent visiting the instructor and chatting in English during office hours is highly recommended.
- ◆ Any misbehavior and non-class related activities in class will result in the lower level of the participation grade, including ringing cell phones.
- ◆ All above behaviors will be solely evaluated by the instructor for scoring.

#### *☞ Textbook*

Students are supposed to bring the textbook to class.

### Topical Course Outline

Week	Date	Topics	Homework
1	Feb, 28	<ul style="list-style-type: none"> <li>● Course Introduction and Syllabus</li> <li>● Introduce the textbook and how to read it</li> <li>● Course Overview</li> <li>● 1.1 What Is the Internet?</li> <li>● 1.2 The Network Edge</li> </ul>	- Read Chapter 1.1-1.3 Computer Networks and the Internet <b>Ideological and political education: Huawei 5G, China fiber penetration: world's number one</b>
		<ul style="list-style-type: none"> <li>● 1.3 The Network Core</li> <li>✓ Packet-switching</li> </ul>	- Ake student to look for Network Core examples, and show up on

		<ul style="list-style-type: none"> <li>✓ Store and forward</li> <li>✓ Queuing delay, loss</li> <li>✓ Network-core functions</li> <li>✓ Circuit switching</li> <li>✓ Network of networks</li> </ul>	<p>paper</p> <ul style="list-style-type: none"> <li>- Comparison of Packet-switching and Circuit switching</li> <li>- Read Chapter 1.3</li> </ul>
2	Mar, 7	<ul style="list-style-type: none"> <li>● 1.4 Delay, Loss, and Throughput in Packet-Switched Networks <ul style="list-style-type: none"> <li>✓ Four sources of packet delay</li> <li>✓ Packet loss</li> <li>✓ Throughput</li> </ul> </li> <li>● Wireshark Lab: Getting Started (Install)</li> </ul>	<ul style="list-style-type: none"> <li>- Read Chapter 1.4 and Chapter 1.5</li> <li>- Will cars arrive to 2nd booth before all cars serviced at first booth?</li> </ul>
3	Mar, 14	<ul style="list-style-type: none"> <li>● 1.5 Protocol Layers and Their Service Models <ul style="list-style-type: none"> <li>✓ Why layering?</li> <li>✓ Internet protocol stack</li> <li>✓ ISO/OSI reference model Encapsulation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- Benefits of layers</li> <li>- Protocol examples of each layer</li> <li>- Unit of each layer</li> <li>- Responsivity of each layer</li> <li>- List 3 different protocols that appear in the protocol column</li> </ul>
		<ul style="list-style-type: none"> <li>● 1.6 Networks Under Attack <ul style="list-style-type: none"> <li>✓ Virus, worm, spyware malware, botnet</li> <li>✓ DDoS</li> </ul> </li> <li>● 1.7 History</li> <li>● Summary of chapter1</li> <li>● Wireshark Lab: Getting Started (Lab report)</li> </ul>	<p style="text-align: center;"><b>Ideological and political education</b></p> <p style="text-align: center;"><b>Networking security technology</b></p> <ul style="list-style-type: none"> <li>- Review Chapter 1</li> <li>- Preview Chapter 2</li> </ul>
4	Mar, 21	<ul style="list-style-type: none"> <li>● 2.1 Principles of Network Applications <ul style="list-style-type: none"> <li>✓ Popular application-level protocols</li> <li>✓ Some network apps</li> <li>✓ CS, P2P architecture</li> <li>✓ Sockets, Addressing processes</li> <li>✓ App-layer protocol</li> </ul> </li> <li>● 2.2 The Web and HTTP <ul style="list-style-type: none"> <li>✓ web page consists of objects</li> <li>✓ request, response</li> <li>✓ general format</li> <li>✓ Cookie</li> <li>✓ proxy server</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- example port numbers</li> <li>- Is HTTP “stateless”</li> <li>- Benefits of cookie</li> <li>- proxy server</li> <li>- FTP port number</li> <li>- What is time difference between HTTP GET, HTTP OK?</li> <li>- How many data-containing TCP segments were needed to carry the single HTTP response and the text of the Bill of Rights?</li> <li>- HTTP version</li> <li>- IF-MODIFIED-SINCE</li> </ul>
		<ul style="list-style-type: none"> <li>● Wireshark Labs: HTTP <ul style="list-style-type: none"> <li>✓ The Basic HTTP GET/response interaction</li> </ul> </li> </ul>	
5	Mar, 28	<ul style="list-style-type: none"> <li>● Wireshark Labs: HTTP <ul style="list-style-type: none"> <li>✓ The HTTP CONDITIONAL GET/response interaction</li> <li>✓ Retrieving Long Documents</li> <li>✓ HTML Documents with Embedded Objects</li> </ul> </li> <li>● HTTP Authentication</li> </ul>	
6	Apr, 4	<b>Qing Ming Festival</b>	<ul style="list-style-type: none"> <li>- Preview Chapter2.3</li> <li>- Revise the report</li> </ul>
7	Apr, 11	<p>Wireshark Labs: HTTP, DNS</p> <ul style="list-style-type: none"> <li>● 2.3 Electronic Mail in the Internet <ul style="list-style-type: none"> <li>✓ Three major components</li> <li>✓ Sample SMTP interaction</li> </ul> </li> </ul> <p>Mail access protocols</p> <ul style="list-style-type: none"> <li>● 2.4 DNS—The Internet’s Directory Service <ul style="list-style-type: none"> <li>✓ DNS services</li> <li>✓ DNS: a distributed, hierarchical database</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- Revise the report</li> </ul>

		<ul style="list-style-type: none"> <li>✓ DNS name resolution example</li> <li>✓ DNS record, protocol, messages</li> </ul>	
8	Apr, 18	Chapter 3 Transport Layer <ul style="list-style-type: none"> <li>● 3.1 Introduction and Transport-Layer Services               <ul style="list-style-type: none"> <li>✓ Transport vs. network layer</li> <li>✓ Household analogy</li> </ul> </li> <li>● 3.2 Multiplexing and Demultiplexing</li> <li>● 3.3 Connectionless Transport: UDP               <ul style="list-style-type: none"> <li>✓ UDP: segment header</li> <li>✓ UDP checksum</li> </ul> </li> </ul>	- Why not centralize DNS? - Preview Chapter 3 The Network Layer How demultiplexing works
9	Apr, 25	● Mid-Term Test and Feedback	
10	May, 2	● <b>Labor Day</b>	
11	May, 9	<ul style="list-style-type: none"> <li>● 3.5 Connection-Oriented Transport: TCP               <ul style="list-style-type: none"> <li>✓ TCP segment structure</li> <li>✓ EstimatedRTT</li> <li>✓ TCP reliable data transfer</li> <li>✓ Retransmission</li> <li>✓ <b>Flow control</b></li> <li>✓ Connection Management</li> </ul> </li> </ul>	Read Chapter 3 Transport Layer - how many fields there are in the UDP header  <b>Ideological and political education</b> Reliable? How can be a trust worthy man? sincerity and honesty
12	May, 16	● Wireshark Lab: TCP	
13	May, 23	● Wireshark Lab: TCP	first 6 segments TCP SYN, SYNACK HTTP POST buffer space throughput
14	May, 30	<ul style="list-style-type: none"> <li>● 4.1 Introduction               <ul style="list-style-type: none"> <li>✓ Two key network-layer functions</li> <li>✓ Interplay between routing and forwarding</li> <li>✓ Network service model</li> </ul> </li> <li>● 4.2 What's inside a router               <ul style="list-style-type: none"> <li>✓ Head-of-the-Line (HOL) blocking</li> </ul> </li> <li>● 4.3 The Internet Protocol (IP)               <ul style="list-style-type: none"> <li>✓ IPv4, IPv6</li> <li>✓ network address translation</li> <li>✓ datagram format</li> <li>✓ IP addressing</li> <li>✓ Fragmentation</li> </ul> </li> <li>● Subnets exercises (subnets, network address &amp; broadcast address)</li> <li>● Solution to Subnets exercises</li> </ul>	- three functions of network layer - routing vs forwarding - IP addressing assigns an address to 223.10.198.250/29, the network address - Self-study for chapter5  <b>Ideological and political education: How do you understand Socialism with Chinese Characteristics? How to find way which is suitable to China?</b>
15	Jun, 6	Presentation	Grade for each group
16	Jun, 13	Presentation	Grade for each group
17	Jun, 20	<b>Final Examination</b>	
18	Dec, 27	Social Practice	
19	Jan, 3	Social Practice	
20	Jan, 10	Social Practice	

*Note: Some chapters or sections may leave for self-study, this is the students' duty to learn and understand, they may also be included in the quizzes or exams. A review in Chinese may be held during L.C. and O.H. in the semester.*

### **Teacher's Office Hour**

- ◆ The instructor's office hour is shown in the front of the office door.
- ◆ Students are suggested to use the instructor's office hour and learning center to ask questions or talk with

the instructor once at least per week for good communication and effective learning, which is recorded in the students' participation.

- ♦ The time can be scheduled by instructors or students, or both.

### **Cheating and Plagiarism**

Cheating is not tolerated. Any student caught cheating on a quiz; test or exam will be given a mark of zero (0) for the particular work. At the beginning of the semester the definition of plagiarism will be carefully explained, when any thoughts or writings of another person are used, they must be clearly identified (usually one uses quotation marks) and the source notes. **If any student is caught cheating on any homework assignment, the highest score the student can earn in that course is a "C".**

### **Important Dates**

Feb.27	Registration
Feb.28	Classes Begin
Mar.4	Last Day to Drop or Add a Course
Apr.5	Qing Ming Festival
Apr.22	Spring Sports
Apr.25 -29	Midterm Test (tentative)
May 1	Labor Day
June 3	Dragon-Boat Festival
June 20-24	Sophomore and Junior students' Final Exam
June 27-July17	Sophomore and Junior students' Social Practice
July11-15	Revision and Final Exam Period
July 18	Summer Vacation Begins

*Note: This syllabus is tentative and may be changed or modified throughout the semester. All students will be notified and a new syllabus will be given.*

**Instructor: Changjun Ru**

**Department Head: Jingning Li**

